

21490YP



SEQUENCE LISTING

<110> Anderson, Annaliesa S.  
Montgomery, Donna L.

<120> POLYPEPTIDES FOR INDUCING A PROTECTIVE  
IMMUNE RESPONSE AGAINST STAPHYLOCOCCUS AUREUS

<130> 21490YP

<140> 10/589,381  
<141> 2006-08-15

<150> PCT/US2005/004431  
<151> 2005-02-14

<150> 60/545,447  
<151> 2004-02-18

<160> 20

<170> FastSEQ for Windows Version 4.0

<210> 1  
<211> 260  
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<213> Artificial Sequence

<220>  
<223> truncated derivative of sai-1

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Met Gly Thr Gln Val Ser Gln Ala Thr Ser Gln Pro Ile Asn Phe Gln  
1 5 10 15  
Val Gln Lys Asp Gly Ser Ser Glu Lys Ser His Met Asp Asp Tyr Met  
20 25 30  
Gln His Pro Gly Lys Val Ile Lys Gln Asn Asn Lys Tyr Tyr Phe Gln  
35 40 45  
Thr Val Leu Asn Asn Ala Ser Phe Trp Lys Glu Tyr Lys Phe Tyr Asn  
50 55 60  
Ala Asn Asn Gln Glu Leu Ala Thr Thr Val Val Asn Asp Asn Lys Lys  
65 70 75 80  
Ala Asp Thr Arg Thr Ile Asn Val Ala Val Glu Pro Gly Tyr Lys Ser  
85 90 95  
Leu Thr Thr Lys Val His Ile Val Val Pro Gln Ile Asn Tyr Asn His  
100 105 110  
Arg Tyr Thr Thr His Leu Glu Phe Glu Lys Ala Ile Pro Thr Leu Ala  
115 120 125  
Asp Ala Ala Lys Pro Asn Asn Val Lys Pro Val Gln Pro Lys Pro Ala  
130 135 140  
Gln Pro Lys Thr Pro Thr Glu Gln Thr Lys Pro Val Gln Pro Lys Val  
145 150 155 160  
Glu Lys Val Lys Pro Thr Val Thr Thr Ser Lys Val Glu Asp Asn  
165 170 175  
His Ser Thr Lys Val Val Ser Thr Asp Thr Thr Lys Asp Gln Thr Lys  
180 185 190  
Thr Gln Thr Ala His Thr Val Lys Thr Ala Gln Thr Ala Gln Glu Gln  
195 200 205  
Asn Lys Val Gln Thr Pro Val Lys Asp Val Ala Thr Ala Lys Ser Glu  
210 215 220

Ser Asn Asn Gln Ala Val Ser Asp Asn Lys Ser Gln Gln Thr Asn Lys  
 225 230 235 240  
 Val Thr Lys His Asn Glu Thr Pro Lys Gln Ala Ser Lys Ala Lys Glu  
 245 250 255  
 Leu Pro Lys Thr  
 260

<210> 2  
 <211> 264  
 <212> PRT  
 <213> S. aureus

&lt;220&gt;

<400> 2

Met	Gly	Thr	Gln	Val	Ser	Gln	Ala	Thr	Ser	Gln	Pro	Ile	Asn	Phe	Gln
1				5				10					15		
Val	Gln	Lys	Asp	Gly	Ser	Ser	Glu	Lys	Ser	His	Met	Asp	Asp	Tyr	Met
	20					25							30		
Gln	His	Pro	Gly	Lys	Val	Ile	Lys	Gln	Asn	Asn	Lys	Tyr	Tyr	Phe	Gln
	35					40					45				
Ala	Val	Leu	Asn	Asn	Ala	Ser	Phe	Trp	Lys	Glu	Tyr	Lys	Phe	Tyr	Asn
	50					55				60					
Ala	Asn	Asn	Gln	Glu	Leu	Ala	Thr	Thr	Val	Val	Asn	Asp	Asp	Lys	Lys
	65					70			75				80		
Ala	Asp	Thr	Arg	Thr	Ile	Asn	Val	Ala	Val	Glu	Pro	Gly	Tyr	Lys	Ser
		85					90						95		
Leu	Thr	Thr	Lys	Val	His	Ile	Val	Val	Pro	Gln	Ile	Asn	Tyr	Asn	His
		100					105						110		
Arg	Tyr	Thr	Thr	His	Leu	Glu	Phe	Glu	Lys	Ala	Ile	Pro	Thr	Leu	Ala
	115					120					125				
Asp	Ala	Ala	Lys	Pro	Asn	Asn	Val	Lys	Pro	Val	Gln	Pro	Lys	Pro	Ala
	130					135					140				
Gln	Pro	Lys	Thr	Pro	Thr	Glu	Gln	Thr	Lys	Pro	Val	Gln	Pro	Lys	Val
	145					150			155				160		
Glu	Lys	Val	Lys	Pro	Ala	Val	Thr	Ala	Pro	Ser	Lys	Asn	Glu	Asn	Arg
		165					170					175			
Gln	Thr	Thr	Lys	Val	Val	Ser	Ser	Glu	Ala	Thr	Lys	Asp	Gln	Ser	Gln
		180					185					190			
Thr	Gln	Ser	Ala	Arg	Thr	Val	Lys	Thr	Thr	Gln	Thr	Ala	Gln	Asp	Gln
	195					200					205				
Asn	Lys	Val	Gln	Thr	Pro	Val	Lys	Asp	Val	Ala	Thr	Ala	Lys	Ser	Glu
	210					215					220				
Ser	Asn	Asn	Gln	Ala	Val	Ser	Asp	Asn	Lys	Ser	Gln	Gln	Thr	Asn	Lys
	225					230			235				240		
Val	Thr	Lys	Gln	Asn	Glu	Val	His	Lys	Gln	Gly	Pro	Ser	Lys	Asp	Ser
						245			250				255		
Lys	Ala	Lys	Glu	Leu	Pro	Lys	Thr								
						260									

<210> 3  
 <211> 280  
 <212> PRT  
 <213> Artificial Sequence

&lt;220&gt;

&lt;223&gt; amino His-tagged construct of SEQ ID NO: 1

<400> 3

Met	Gly	Ser	Ser	His	His	His	His	His	Ser	Ser	Gly	Leu	Val	Pro
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Arg Gly Ser His Met Gly Thr Gln Val Ser Gln Ala Thr Ser Gln Pro  
     20                25                30  
 Ile Asn Phe Gln Val Gln Lys Asp Gly Ser Ser Glu Lys Ser His Met  
     35                40                45  
 Asp Asp Tyr Met Gln His Pro Gly Lys Val Ile Lys Gln Asn Asn Lys  
     50                55                60  
 Tyr Tyr Phe Gln Thr Val Leu Asn Asn Ala Ser Phe Trp Lys Glu Tyr  
     65                70                75                80  
 Lys Phe Tyr Asn Ala Asn Asn Gln Glu Leu Ala Thr Thr Val Val Asn  
     85                90                95  
 Asp Asn Lys Lys Ala Asp Thr Arg Thr Ile Asn Val Ala Val Glu Pro  
     100               105               110  
 Gly Tyr Lys Ser Leu Thr Thr Lys Val His Ile Val Val Pro Gln Ile  
     115               120               125  
 Asn Tyr Asn His Arg Tyr Thr Thr His Leu Glu Phe Glu Lys Ala Ile  
     130               135               140  
 Pro Thr Leu Ala Asp Ala Ala Lys Pro Asn Asn Val Lys Pro Val Gln  
     145               150               155               160  
 Pro Lys Pro Ala Gln Pro Lys Thr Pro Thr Glu Gln Thr Lys Pro Val  
     165               170               175  
 Gln Pro Lys Val Glu Lys Val Lys Pro Thr Val Thr Thr Ser Lys  
     180               185               190  
 Val Glu Asp Asn His Ser Thr Lys Val Val Ser Thr Asp Thr Thr Lys  
     195               200               205  
 Asp Gln Thr Lys Thr Gln Thr Ala His Thr Val Lys Thr Ala Gln Thr  
     210               215               220  
 Ala Gln Glu Gln Asn Lys Val Gln Thr Pro Val Lys Asp Val Ala Thr  
     225               230               235               240  
 Ala Lys Ser Glu Ser Asn Asn Gln Ala Val Ser Asp Asn Lys Ser Gln  
     245               250               255  
 Gln Thr Asn Lys Val Thr Lys His Asn Glu Thr Pro Lys Gln Ala Ser  
     260               265               270  
 Lys Ala Lys Glu Leu Pro Lys Thr  
     275               280

<210> 4  
 <211> 284  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> amino His-tagged construct of SEQ ID NO: 2

<400> 4

Met	Gly	Ser	Ser	His	His	His	His	His	Ser	Ser	Gly	Leu	Val	Pro	
1									10					15	
Arg	Gly	Ser	His	Met	Gly	Thr	Gln	Val	Ser	Gln	Ala	Thr	Ser	Gln	Pro
				20				25				30			
Ile	Asn	Phe	Gln	Val	Gln	Lys	Asp	Gly	Ser	Ser	Glu	Lys	Ser	His	Met
						35		40			45				
Asp	Asp	Tyr	Met	Gln	His	Pro	Gly	Lys	Val	Ile	Lys	Gln	Asn	Asn	Lys
					50			55			60				
Tyr	Tyr	Phe	Gln	Ala	Val	Leu	Asn	Asn	Ala	Ser	Phe	Trp	Lys	Glu	Tyr
					65			70			75			80	
Lys	Phe	Tyr	Asn	Ala	Asn	Asn	Gln	Glu	Leu	Ala	Thr	Thr	Val	Val	Asn
						85			90			95			
Asp	Asp	Lys	Lys	Ala	Asp	Thr	Arg	Thr	Ile	Asn	Val	Ala	Val	Glu	Pro
						100			105			110			
Gly	Tyr	Lys	Ser	Leu	Thr	Thr	Lys	Val	His	Ile	Val	Val	Pro	Gln	Ile
						115			120			125			

Asn Tyr Asn His Arg Tyr Thr Thr His Leu Glu Phe Glu Lys Ala Ile  
 130 135 140  
 Pro Thr Leu Ala Asp Ala Ala Lys Pro Asn Asn Val Lys Pro Val Gln  
 145 150 155 160  
 Pro Lys Pro Ala Gln Pro Lys Thr Pro Thr Glu Gln Thr Lys Pro Val  
 165 170 175  
 Gln Pro Lys Val Glu Lys Val Lys Pro Ala Val Thr Ala Pro Ser Lys  
 180 185 190  
 Asn Glu Asn Arg Gln Thr Thr Lys Val Val Ser Ser Glu Ala Thr Lys  
 195 200 205  
 Asp Gln Ser Gln Thr Gln Ser Ala Arg Thr Val Lys Thr Thr Gln Thr  
 210 215 220  
 Ala Gln Asp Gln Asn Lys Val Gln Thr Pro Val Lys Asp Val Ala Thr  
 225 230 235 240  
 Ala Lys Ser Glu Ser Asn Asn Gln Ala Val Ser Asp Asn Lys Ser Gln  
 245 250 255  
 Gln Thr Asn Lys Val Thr Lys Gln Asn Glu Val His Lys Gln Gly Pro  
 260 265 270  
 Ser Lys Asp Ser Lys Ala Lys Glu Leu Pro Lys Thr  
 275 280

<210> 5

<211> 268

<212> PRT

<213> Artificial Sequence

<220>

<223> carboxyl His-tagged construct of SEQ ID NO: 1

<400> 5

Met Gly Thr Gln Val Ser Gln Ala Thr Ser Gln Pro Ile Asn Phe Gln  
 1 5 10 15  
 Val Gln Lys Asp Gly Ser Ser Glu Lys Ser His Met Asp Asp Tyr Met  
 20 25 30  
 Gln His Pro Gly Lys Val Ile Lys Gln Asn Asn Lys Tyr Tyr Phe Gln  
 35 40 45  
 Thr Val Leu Asn Asn Ala Ser Phe Trp Lys Glu Tyr Lys Phe Tyr Asn  
 50 55 60  
 Ala Asn Asn Gln Glu Leu Ala Thr Thr Val Val Asn Asp Asn Lys Lys  
 65 70 75 80  
 Ala Asp Thr Arg Thr Ile Asn Val Ala Val Glu Pro Gly Tyr Lys Ser  
 85 90 95  
 Leu Thr Thr Lys Val His Ile Val Val Pro Gln Ile Asn Tyr Asn His  
 100 105 110  
 Arg Tyr Thr Thr His Leu Glu Phe Glu Lys Ala Ile Pro Thr Leu Ala  
 115 120 125  
 Asp Ala Ala Lys Pro Asn Asn Val Lys Pro Val Gln Pro Lys Pro Ala  
 130 135 140  
 Gln Pro Lys Thr Pro Thr Glu Gln Thr Lys Pro Val Gln Pro Lys Val  
 145 150 155 160  
 Glu Lys Val Lys Pro Thr Val Thr Thr Ser Lys Val Glu Asp Asn  
 165 170 175  
 His Ser Thr Lys Val Val Ser Thr Asp Thr Thr Lys Asp Gln Thr Lys  
 180 185 190  
 Thr Gln Thr Ala His Thr Val Lys Thr Ala Gln Thr Ala Gln Glu Gln  
 195 200 205  
 Asn Lys Val Gln Thr Pro Val Lys Asp Val Ala Thr Ala Lys Ser Glu  
 210 215 220  
 Ser Asn Asn Gln Ala Val Ser Asp Asn Lys Ser Gln Gln Thr Asn Lys  
 225 230 235 240

Val	Thr	Lys	His	Asn	Glu	Thr	Pro	Lys	Gln	Ala	Ser	Lys	Ala	Lys	Glu
					245				250					255	
Leu	Pro	Lys	Thr	Leu	Glu	His									
					260				265						

<210> 6  
<211> 395  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> amino His-tagged construct of SEQ ID NO: 7

<400> 6																
Met	His	His	His	His	His	Ser	Ser	Gly	Leu	Val	Pro	Arg	Gly	Ser		
						5			10					15		
Gly	Met	Lys	Glu	Thr	Ala	Ala	Ala	Lys	Phe	Glu	Arg	Gln	His	Met	Asp	
						20			25					30		
Ser	Pro	Asp	Leu	Gly	Thr	Asp	Asp	Asp	Asp	Lys	Ala	Met	Gly	Thr	Lys	
						35			40					45		
His	Tyr	Leu	Asn	Ser	Lys	Tyr	Gln	Ser	Glu	Gln	Arg	Ser	Ser	Ala	Met	
						50			55					60		
Lys	Lys	Ile	Thr	Met	Gly	Thr	Ala	Ser	Ile	Ile	Leu	Gly	Ser	Leu	Val	
						65			70					80		
Tyr	Ile	Gly	Ala	Asp	Ser	Gln	Gln	Val	Asn	Ala	Ala	Thr	Glu	Ala	Thr	
						85			90					95		
Asn	Ala	Thr	Asn	Asn	Gln	Ser	Thr	Gln	Val	Ser	Gln	Ala	Thr	Ser	Gln	
						100			105					110		
Pro	Ile	Asn	Phe	Gln	Val	Gln	Lys	Asp	Gly	Ser	Ser	Glu	Lys	Ser	His	
						115			120					125		
Met	Asp	Asp	Tyr	Met	Gln	His	Pro	Gly	Lys	Val	Ile	Lys	Gln	Asn	Asn	
						130			135					140		
Lys	Tyr	Tyr	Phe	Gln	Thr	Val	Leu	Asn	Ala	Ser	Phe	Trp	Lys	Glu		
						145			150					160		
Tyr	Lys	Phe	Tyr	Asn	Ala	Asn	Asn	Gln	Glu	Leu	Ala	Thr	Thr	Val	Val	
						165			170					175		
Asn	Asp	Asn	Lys	Lys	Ala	Asp	Thr	Arg	Thr	Ile	Asn	Val	Ala	Val	Glu	
						180			185					190		
Pro	Gly	Tyr	Lys	Ser	Leu	Thr	Thr	Lys	Val	His	Ile	Val	Val	Pro	Gln	
						195			200					205		
Ile	Asn	Tyr	Asn	His	Arg	Tyr	Thr	Thr	His	Leu	Glu	Phe	Glu	Lys	Ala	
						210			215					220		
Ile	Pro	Thr	Leu	Ala	Asp	Ala	Ala	Lys	Pro	Asn	Asn	Val	Lys	Pro	Val	
						225			230					240		
Gln	Pro	Lys	Pro	Ala	Gln	Pro	Lys	Thr	Pro	Thr	Glu	Gln	Thr	Lys	Pro	
						245			250					255		
Val	Gln	Pro	Lys	Val	Glu	Lys	Val	Lys	Pro	Thr	Val	Thr	Thr	Ser		
						260			265					270		
Lys	Val	Glu	Asp	Asn	His	Ser	Thr	Lys	Val	Val	Ser	Thr	Asp	Thr	Thr	
						275			280					285		
Lys	Asp	Gln	Thr	Lys	Thr	Gln	Thr	Ala	His	Thr	Val	Lys	Thr	Ala	Gln	
						290			295					300		
Thr	Ala	Gln	Glu	Gln	Asn	Lys	Val	Gln	Thr	Pro	Val	Lys	Asp	Val	Ala	
						305			310					320		
Thr	Ala	Lys	Ser	Glu	Ser	Asn	Asn	Gln	Ala	Val	Ser	Asp	Asn	Lys	Ser	
						325			330					335		
Gln	Gln	Thr	Asn	Lys	Val	Thr	Lys	His	Asn	Glu	Thr	Pro	Lys	Gln	Ala	
						340			345					350		
Ser	Lys	Ala	Lys	Glu	Leu	Pro	Lys	Thr	Gly	Leu	Thr	Ser	Val	Asp	Asn	
						355			360					365		

Phe	Ile	Ser	Thr	Val	Ala	Phe	Ala	Thr	Leu	Ala	Leu	Leu	Gly	Ser	Leu
370						375					380				
Ser	Leu	Leu	Leu	Phe	Lys	Arg	Lys	Glu	Ser	Lys					
385				390				395							

<210> 7  
<211> 350  
<212> PRT  
<213> S. aureus

<400>	7														
Met	Thr	Lys	His	Tyr	Leu	Asn	Ser	Lys	Tyr	Gln	Ser	Glu	Gln	Arg	Ser
1									10					15	
Ser	Ala	Met	Lys	Lys	Ile	Thr	Met	Gly	Thr	Ala	Ser	Ile	Ile	Leu	Gly
								20				25		30	
Ser	Leu	Val	Tyr	Ile	Gly	Ala	Asp	Ser	Gln	Gln	Val	Asn	Ala	Ala	Thr
								35			40		45		
Glu	Ala	Thr	Asn	Ala	Thr	Asn	Asn	Gln	Ser	Thr	Gln	Val	Ser	Gln	Ala
								50			55		60		
Thr	Ser	Gln	Pro	Ile	Asn	Phe	Gln	Val	Gln	Lys	Asp	Gly	Ser	Ser	Glu
								65			70		75		80
Lys	Ser	His	Met	Asp	Asp	Tyr	Met	Gln	His	Pro	Gly	Lys	Val	Ile	Lys
								85			90		95		
Gln	Asn	Asn	Lys	Tyr	Tyr	Phe	Gln	Thr	Val	Leu	Asn	Asn	Ala	Ser	Phe
								100			105		110		
Trp	Lys	Glu	Tyr	Lys	Phe	Tyr	Asn	Ala	Asn	Asn	Gln	Glu	Leu	Ala	Thr
								115			120		125		
Thr	Val	Val	Asn	Asp	Asn	Lys	Lys	Ala	Asp	Thr	Arg	Thr	Ile	Asn	Val
								130			135		140		
Ala	Val	Glu	Pro	Gly	Tyr	Lys	Ser	Leu	Thr	Thr	Lys	Val	His	Ile	Val
								145			150		155		160
Val	Pro	Gln	Ile	Asn	Tyr	Asn	His	Arg	Tyr	Thr	Thr	His	Leu	Glu	Phe
								165			170		175		
Glu	Lys	Ala	Ile	Pro	Thr	Leu	Ala	Asp	Ala	Ala	Lys	Pro	Asn	Asn	Val
								180			185		190		
Lys	Pro	Val	Gln	Pro	Lys	Pro	Ala	Gln	Pro	Lys	Thr	Pro	Thr	Glu	Gln
								195			200		205		
Thr	Lys	Pro	Val	Gln	Pro	Lys	Val	Glu	Lys	Val	Lys	Pro	Thr	Val	Thr
								210			215		220		
Thr	Thr	Ser	Lys	Val	Glu	Asp	Asn	His	Ser	Thr	Lys	Val	Val	Ser	Thr
								225			230		235		240
Asp	Thr	Thr	Lys	Asp	Gln	Thr	Lys	Thr	Gln	Thr	Ala	His	Thr	Val	Lys
								245			250		255		
Thr	Ala	Gln	Thr	Ala	Gln	Glu	Gln	Asn	Lys	Val	Gln	Thr	Pro	Val	Lys
								260			265		270		
Asp	Val	Ala	Thr	Ala	Lys	Ser	Glu	Ser	Asn	Asn	Gln	Ala	Val	Ser	Asp
								275			280		285		
Asn	Lys	Ser	Gln	Gln	Thr	Asn	Lys	Val	Thr	Lys	His	Asn	Glu	Thr	Pro
								290			295		300		
Lys	Gln	Ala	Ser	Lys	Ala	Lys	Glu	Leu	Pro	Lys	Thr	Gly	Leu	Thr	Ser
								305			310		315		320
Val	Asp	Asn	Phe	Ile	Ser	Thr	Val	Ala	Phe	Ala	Thr	Leu	Ala	Leu	Leu
								325			330		335		
Gly	Ser	Leu	Ser	Leu	Leu	Leu	Phe	Lys	Arg	Lys	Glu	Ser	Lys		
								340			345		350		

<210> 8  
<211> 354  
<212> PRT  
<213> S. aureus

<400> 8  
Met Thr Lys His Tyr Leu Asn Ser Lys Tyr Gln Ser Glu Gln Arg Ser  
1 5 10 15  
Ser Ala Met Lys Lys Ile Thr Met Gly Thr Ala Ser Ile Ile Leu Gly  
20 25 30  
Ser Leu Val Tyr Ile Gly Ala Asp Ser Gln Gln Val Asn Ala Ala Thr  
35 40 45  
Glu Ala Thr Asn Ala Thr Asn Asn Gln Ser Thr Gln Val Ser Gln Ala  
50 55 60  
Thr Ser Gln Pro Ile Asn Phe Gln Val Gln Lys Asp Gly Ser Ser Glu  
65 70 75 80  
Lys Ser His Met Asp Asp Tyr Met Gln His Pro Gly Lys Val Ile Lys  
85 90 95  
Gln Asn Asn Lys Tyr Tyr Phe Gln Ala Val Leu Asn Asn Ala Ser Phe  
100 105 110  
Trp Lys Glu Tyr Lys Phe Tyr Asn Ala Asn Asn Gln Glu Leu Ala Thr  
115 120 125  
Thr Val Val Asn Asp Asp Lys Lys Ala Asp Thr Arg Thr Ile Asn Val  
130 135 140  
Ala Val Glu Pro Gly Tyr Lys Ser Leu Thr Thr Lys Val His Ile Val  
145 150 155 160  
Val Pro Gln Ile Asn Tyr Asn His Arg Tyr Thr Thr His Leu Glu Phe  
165 170 175  
Glu Lys Ala Ile Pro Thr Leu Ala Asp Ala Ala Lys Pro Asn Asn Val  
180 185 190  
Lys Pro Val Gln Pro Lys Pro Ala Gln Pro Lys Thr Pro Thr Glu Gln  
195 200 205  
Thr Lys Pro Val Gln Pro Lys Val Glu Lys Val Lys Pro Ala Val Thr  
210 215 220  
Ala Pro Ser Lys Asn Glu Asn Arg Gln Thr Thr Lys Val Val Ser Ser  
225 230 235 240  
Glu Ala Thr Lys Asp Gln Ser Gln Thr Gln Ser Ala Arg Thr Val Lys  
245 250 255  
Thr Thr Gln Thr Ala Gln Asp Gln Asn Lys Val Gln Thr Pro Val Lys  
260 265 270  
Asp Val Ala Thr Ala Lys Ser Glu Ser Asn Asn Gln Ala Val Ser Asp  
275 280 285  
Asn Lys Ser Gln Gln Thr Asn Lys Val Thr Lys Gln Asn Glu Val His  
290 295 300  
Lys Gln Gly Pro Ser Lys Asp Ser Lys Ala Lys Glu Leu Pro Lys Thr  
305 310 315 320  
Gly Leu Thr Ser Val Asp Asn Phe Ile Ser Thr Val Ala Phe Ala Thr  
325 330 335  
Leu Ala Leu Leu Gly Ser Leu Ser Leu Leu Leu Phe Lys Arg Lys Glu  
340 345 350  
Ser Lys

<210> 9  
<211> 358  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> carboxyl His-tagged construct of SEQ ID NO: 7

<400> 9  
Met Thr Lys His Tyr Leu Asn Ser Lys Tyr Gln Ser Glu Gln Arg Ser  
1 5 10 15  
Ser Ala Met Lys Lys Ile Thr Met Gly Thr Ala Ser Ile Ile Leu Gly  
20 25 30

Ser Leu Val Tyr Ile Gly Ala Asp Ser Gln Gln Val Asn Ala Ala Thr  
       35                 40                 45  
 Glu Ala Thr Asn Ala Thr Asn Asn Gln Ser Thr Gln Val Ser Gln Ala  
       50                 55                 60  
 Thr Ser Gln Pro Ile Asn Phe Gln Val Gln Lys Asp Gly Ser Ser Glu  
       65                 70                 75                 80  
 Lys Ser His Met Asp Asp Tyr Met Gln His Pro Gly Lys Val Ile Lys  
       85                 90                 95  
 Gln Asn Asn Lys Tyr Tyr Phe Gln Thr Val Leu Asn Asn Ala Ser Phe  
       100                105                110  
 Trp Lys Glu Tyr Lys Phe Tyr Asn Ala Asn Asn Gln Glu Leu Ala Thr  
       115                120                125  
 Thr Val Val Asn Asp Asn Lys Lys Ala Asp Thr Arg Thr Ile Asn Val  
       130                135                140  
 Ala Val Glu Pro Gly Tyr Lys Ser Leu Thr Thr Lys Val His Ile Val  
       145                150                155                160  
 Val Pro Gln Ile Asn Tyr Asn His Arg Tyr Thr Thr His Leu Glu Phe  
       165                170                175  
 Glu Lys Ala Ile Pro Thr Leu Ala Asp Ala Ala Lys Pro Asn Asn Val  
       180                185                190  
 Lys Pro Val Gln Pro Lys Pro Ala Gln Pro Lys Thr Pro Thr Glu Gln  
       195                200                205  
 Thr Lys Pro Val Gln Pro Lys Val Glu Lys Val Lys Pro Thr Val Thr  
       210                215                220  
 Thr Thr Ser Lys Val Glu Asp Asn His Ser Thr Lys Val Val Ser Thr  
       225                230                235                240  
 Asp Thr Thr Lys Asp Gln Thr Lys Thr Gln Thr Ala His Thr Val Lys  
       245                250                255  
 Thr Ala Gln Thr Ala Gln Glu Gln Asn Lys Val Gln Thr Pro Val Lys  
       260                265                270  
 Asp Val Ala Thr Ala Lys Ser Glu Ser Asn Asn Gln Ala Val Ser Asp  
       275                280                285  
 Asn Lys Ser Gln Gln Thr Asn Lys Val Thr Lys His Asn Glu Thr Pro  
       290                295                300  
 Lys Gln Ala Ser Lys Ala Lys Glu Leu Pro Lys Thr Gly Leu Thr Ser  
       305                310                315                320  
 Val Asp Asn Phe Ile Ser Thr Val Ala Phe Ala Thr Leu Ala Leu Leu  
       325                330                335  
 Gly Ser Leu Ser Leu Leu Phe Lys Arg Lys Glu Ser Lys Leu Glu  
       340                345                350  
 His His His His His  
       355

&lt;210&gt; 10

&lt;211&gt; 843

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; nucleic acid sequence encoding SEQ ID NO: 3

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